

HEARING SCREENING: PURE TONE AUDIOMETRY

QUALIFIED SCREENERS

7-005.01 For the purposes of the school officials verifying that a qualified screener is carrying out the required screening activity, the qualified screener is a person who follows the competencies for accurate, reliable measurement as described in 7-004 and found in Attachment 2 (and incorporated in these guidelines), **and** who meets **one** of the following descriptions (7-005.02 through 7-005.04):

7-005.02 The screener has been determined competent to perform the screening method by a licensed health care professional within the previous three years. Documentation in writing of such competency determination shall include:

7-005.02A The name of the individual who successfully completed the competency determination and the date the determination was conducted;

7-005.02B The type of screening with type(s) of equipment used in the competency determination for the respective screenings; and

7-005.02C The name and license number of the licensed health professional conducting the competency assessment; OR

7-005.03 The screener will receive direct supervision from a licensed health care professional while screening; OR

7-005.04 Screening is conducted by a licensed health care professional, as follows:

7.005.04A A Nebraska-credentialed health care professional registered nurse, licensed practical nurse, advanced practice registered nurse-nurse practitioner, physician assistant, or physician, are authorized to perform health screening at school.

7.005.04B Other licensed health professionals authorized to conduct specific screenings in addition to health professionals identified in 7-005.01 are:

Hearing: Audiologists and speech language pathologists.

Vision: Optometrists.

Dental Health: Dentists and dental hygienists.

7-005.05 **Record of persons qualified to screen**

The school must keep on file for a minimum of three (3) years the name, profession, license number, or written verification of competency in the screening method, for each screener permitted by the school to perform health screening.

COMPETENCIES FOR ACCURATE MEASUREMENT

HEARING SCREENING (PURETONE AUDIOMETRY) COMPETENCIES

Essential Steps for Accurate Measurement

COMPETENCY	KEY POINTS
1. Assess environment for ambient background noise that will disrupt screening.	<p><i>Conduct screening in an environment with minimal visual and auditory distractions. Ambient noise levels must be sufficiently low to allow for accurate screening.</i></p> <p><i>For screening environments, ambient noise levels should not exceed 49.5 dB at 1000 Hz, 54.5 dB at 2000 Hz, and 62 dB at 4000 Hz when measured using a sound level meter with octave-band filters centered on the screening frequencies. These levels are derived from consideration of ANSI (1991) standards for pure-tone threshold testing, and are adjusted for the 20 dB screening level.</i></p>
2. Assemble equipment in desired location.	<p><i>The audiometer should be on for five minutes (minimum) prior to use. A table and two chairs are required. The student should be positioned to face away from the machine, within view of the screener. The student should not be able to see the examiner's hands or movements.</i></p>
3. Check the audiometer: ✓ Check cords, cushions, and headbands for excessive wearing or cracking. ✓ Check dials and switches for alignment and ease of movement. ✓ Listen for the tone through each earphone. ✓ With the audiometer set for continuous tone, slide the entire length of the cords between the thumb and index finger noting any change in output signal. ✓ Gently shake the cords. There should be no static, hum, or interruption of the signal.	<p><i>The audiometer should always be stored with the cords loosely bundled into the box. Wrapping the cords around the head phones damages the wires and will affect the instrument.</i></p> <p><i>The audiometer should be professionally serviced and calibrated on an annual basis (minimum).</i></p>

<ul style="list-style-type: none"> ✓ Make sure when tone is directed to one earphone, no sound is heard from the other earphone. ✓ Make sure a steady tone is present at all frequencies. With the tone switch in “normal-off” position, press the interrupter switch several times to make sure the tone is present each time. ✓ Listen to the frequencies at 20 dB to make sure the tones are audible to the screener with normal hearing. 	
<p>4. Give simple but complete instructions to the student: “Listen very carefully. You will hear one tone at a time, sometimes very soft and sometimes louder. When you hear a sound, raise your hand so I can see you have heard that sound, then put your head down and wait for the next sound.”</p>	<p><i>While many students are “trained” to do so, it is not necessary (or significant) for the validity of the screening that the student raises only the hand on the side he or she hears the sound. For the purposes of screening, the student and the screener agree on the reliable signal the student will make indicating he or she has heard a sound.</i></p>
<p>4. Place earphones comfortably and securely on the student’s head: red earphone on the right, blue on the left. The center of the ear pad should be centered over the opening of the ear.</p>	<p><i>Push hair behind ears. Make sure headbands or other hair decorations, eyeglasses, and/or earrings are not interfering with the correct placement of the earphones.</i></p> <p>Head Lice Precautions</p> <p><i>Use of the audiometer for one student after another may provide a mechanism for physical transport of head lice between students. In school settings where head lice are known to be a concern, the school nurse may consider conducting school wide head checks prior to the screening activity, conducting head checks concurrently with the screening, using a shower cap barrier for each child, and/or having supplies to physically clean (with damp cloth and disinfectant) head phones between children.</i></p>
<p>5. Offer a test sound of 40 dB at 4000 Hz to confirm the student</p>	<p><i>Set the tone switch in the “normal-off” position so the tone will sound only when the</i></p>

demonstrates understanding of the instructions.	<i>screener presses the interrupter switch.</i>
<p>6. Proceed with offering screening tones as follows each delivered separately to the right and left, all at 20 dB, for 2 seconds' duration (say, "hearing test" to yourself).</p> <p>Vary time intervals and sequence between tones. Each tone may be offered up to three times to determine response.</p> <p>Testing frequencies are: 1000 Hz, 2000Hz, 4000 Hz.</p> <p>Pass if the child's responses are judged to be clinically reliable at least 2 out of 3 times at the criterion decibel level at each frequency in each ear.</p>	<p><i>Work quickly, offer praise. Children with hearing problems may "Pass" due to anticipating patterning by the screener.</i></p> <p><i>It is not necessary to continue screening in order to determine the decibel level at which the student does indicate hearing the sound ("threshold screening".)</i></p> <p><i>It is sufficient for the purposes of screening to identify whether the student does or does not indicate hearing at desired frequencies at 20 dB.</i></p>
7. Record results.	<p><i>The screening procedure identifies the child apparently not hearing the given frequencies at 20 decibels.</i></p> <p><i>Record results by identifying for the Right and Left sides the results for each frequency at 20dB: P (pass) or NP (not passed).</i></p> <p><i>For example:</i> <i>R: 1000/P L: 1000/P</i> <i>R: 2000/P L: 2000/NP</i> <i>R: 4000/NP L: 4000/P</i></p>
8. Identify the student who should be rescreened, if available, and/or parent notified.	<p><i>The student who misses any of the frequency tones at 20dB should be rescreened and, if missed tone or tones persist, referred for further evaluation by physician or audiologist.</i></p> <p><i>Rescreening should be performed 2-4 weeks following the initial screen. The rescreening validates the initial finding and also allows resolution of transient congestion or inflammation which might temporarily affect</i></p>

	<p><i>hearing – while not allowing excessive delay before further evaluation if indicated.</i></p> <p><i>Referrals may be made either to a community medical provider or community audiologist of the parent/guardian's preference, or to the district audiologist. Post treatment screening is indicated to obtain the final outcome of the screening process.</i></p>
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WHO MUST BE SCREENED

Screening for hearing is to be conducted annually for students in preschool and Kindergarten, and grades 1- 4, 7th and 10th grade. Students verified as having hearing screened during the kindergarten and seventh-grade physical examinations need not be rescreened at school.

Additional indications for screening:

1. New to district at any time, with no previous screening results available.
2. Periodic screenings as specified by the student's Individualized Education Plan (IEP)
3. Nurse concern, i.e. sudden wt. loss/gain, change in stature or appearance; parent or teacher concern; audiologist referral.
4. Unremediated concerns from previous year.

Students with identified hearing deficits should be followed regularly by a district audiologist or other hearing professional and need not be screened regularly unless for the purpose of inclusion of the affected child in a school activity. Such students are identified to the school nurse by the district audiologist annually. On occasion, the nurse may be asked to assist the audiologist in monitoring hearing levels in a student previously identified with hearing issues.

RESCREENING AND SPECIAL CONSIDERATIONS

The student who does not respond to all three screening frequencies (1000 Hz, 2000 Hz, and 4000 Hz) at the screening level of 20 decibels should be rescreened in two to four weeks.

Successful hearing screening requires a child who is able to hear the given tone and coordinate a response to the examiner. Children who are developmentally or physically unable to understand the screening procedure or who are unable to communicate consistently may be difficult to screen in the school setting using pure tone audiometry. Consultation with or referral to the district audiologist or a

hearing specialist in order to obtain screening results may be necessary in some cases. If no educational audiologist is available, the parent should be notified of need for hearing evaluation by a community medical or hearing professional.

Students with signs of ear infection including pain, elevated temperature, upper airway congestion, redness or drainage to the ears, excessive cerumen, foreign objects, or other medical concerns may be referred to parent/guardian for medical evaluation prior to screening.

Children with special health care needs who cannot be assessed using the usual school methods should not be left out of the screening program. Individualized conversations with parents/guardians to determine how the student's hearing is assessed by the child's medical provider, or a combination of physical assessment and observation, may be needed to discern hearing status.

NOTIFICATION OF NEED FOR FURTHER EVALUATION

Parents should be notified when the child does not pass rescreening. At the school nurse's discretion, parents may be contacted after the initial screening failure if medical issues are suspected. Parents frequently will have information to share about their child's hearing, for example observations of behavior that do or do not support the screening results, medical concerns of the ears such as frequent infection or previously recognized hearing concerns, or known congenital concerns.

Parents may choose medical or audiological follow-up to the referral. Otoscopic examination of the child's ears by the licensed nurse and review of medical history with the parent may help indicate the most appropriate strategy for referral and follow-up.

The school nurse should request a report of the medical findings if the parent/guardian chooses medical rather than audiological referral. When a medical concern is identified and remediated, such as ear infection, treatment should be followed by a repeat of audiometric screening by the school nurse to ascertain final screening outcome.

DATA

Data Goals of Screening are:

- a) Identify baseline measures (proportion of children screened who do not pass) and monitor trends over time.
- b) Understand health disparities affecting Nebraska's school aged children (compare results by group).
- c) Use screening data as an indicator of the quality of the screening practice (if passing rate is lower than expected, review screening process).

- d) Compare measures across time and location.
- e) Explore the relationship between the condition, academic performance, and absenteeism (compare absenteeism and performance for those who do not pass with those that do pass the screening).
- f) Understand the need for vision services for children in Nebraska; begin to identify barriers to care and systemic approaches to improving access to vision care.

Estimates of the prevalence of hearing loss in school-age children range between 11.3% and 14.9%. Hearing loss may occur alone or in combination with other disabilities. Children with language and learning disabilities have an increased incidence of hearing loss compared with the general population. Hearing loss affects communication, learning, psychosocial development, and academic achievement.

BACKGROUND INFORMATION

The purpose of screening children is to identify those with hearing status inadequate for age-appropriate developmental and learning activities.

Indicators of possible hearing loss include:

- recurring otitis media or upper respiratory infections
- mouth breathing
- draining ears; earache complaints
- sudden school failure following a severe illness
- frequent requests to repeat what has just been said
- irrelevant answers to questions
- turning one side of head toward speaker
- talking either too loudly or too softly
- indistinct speech (slurring or omission of sounds)
- watching the lips of the speaker
- inattention to classroom discussion
- mistakes in following directions
- tendency to isolate self
- passivity and easy tiring.

The most common cause of hearing loss in young children is otitis media, which may result in a conductive hearing loss. Conductive hearing loss is usually amenable to medical treatment.

Sensorineural hearing loss is caused by a variety of illnesses and conditions. It is usually permanent, may be progressive, and has a total incidence of at least 10 per 1,000 students.

Children with minimal to moderate and/or unilateral hearing loss are often identified late because they seem to hear and develop socially adequate speech and language. Identification of hearing loss and auditory processing disorders may be further complicated or delayed if there are differences in the home and school languages.

Source: American Speech-Language Hearing Association (2002). Guidelines for Audiology Service Provision in and for Schools. Rockville, MD: Author.

RESOURCES

Resources for calibration

Tips for Screening the Young Child: Play Audiometry

American Academy of Pediatrics Clinical Report (2003). Hearing Assessment in Infants and Children: Recommendations Beyond Neonatal Screening.

<http://aappolicy.aappublications.org/cgi/reprint/pediatrics;111/2/436.pdf>

American Speech-Language Hearing Association (2002). Guidelines for Audiology Service Provision in and for Schools. Rockville, MD: Author.

www.asha.org

National Association of School Nurses (1998). The Ear and Hearing: A Guide for School Nurses. Castle Rock: CO. Author.

National Hearing Conservation Association.

http://www.hearingconservation.org/rs_forKids_hearingConsProg.html

National Institute on Deafness and Other Communication Disorders.

<http://www.nidcd.nih.gov/health/hearing/wisseeears.asp>

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1. Effects of Hearing Loss on Development
2. Hearing Loss and Its Implications for Learning and Communication
3. Funding Resources for Audiology Services and Hearing Aids
4. Children and Hearing Aids
5. Cochlear implants

American Speech-Language-Hearing Association. (1998) Position statement and guidelines on support personnel in audiology. ASHA, 40 (Spring, Suppl. 18), 19-21.

FORMS

Competency determination documentation

Competency quick reference

Sample notification of need for further evaluation